

In the Claims

Please cancel claims 1-19 without prejudice. Please add new claims 20-39 which do not add new matter.

B 20. (New) A flow metering system for use in controlling a reformation reaction in a hydrogen production system, said flow metering system comprising:  
a first flowmeter configured to measure a mass flow rate of a hydrocarbon feedstock from a hydrocarbon feedstock supply and to produce a hydrocarbon flow rate signal representing said mass flow rate of said hydrocarbon feedstock;  
a second flowmeter configured to measure a flow rate of steam from a steam supply and to produce a steam flow rate signal representing said flow rate of said steam; and  
a controller configured to receive said hydrocarbon flow rate signal and said steam flow rate signal, to receive an estimated carbon content factor, said estimated carbon content factor being based on at least one potential constituent of said hydrocarbon feedstock, to process said mass flow rate of said hydrocarbon feedstock and said estimated carbon content factor to determine an estimated carbon content of said hydrocarbon feedstock, to process said steam ratio for said hydrogen production system, and to process said estimated carbon content of said hydrocarbon feedstock, said flow rate of said steam, and said carbon-to-steam ratio to control at least one of said flow rate of said steam and said flow rate of said hydrocarbon feedstock.

21. (New) The flow metering system of claim 20 wherein said estimated carbon content factor is based on a mass of carbon for said at least one potential constituent of said hydrocarbon feedstock.

22. (New) The flow metering system of claim 20 wherein said estimated carbon content factor is based on a mass of carbon for said at least one potential constituent in relation to a total mass of said at least one potential constituent.

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23. (New) The flow metering system of claim 20 wherein said controller is configured to:

select said estimated carbon content factor from a range of carbon content factors for said hydrocarbon feedstock.

24. (New) The flow metering system of claim 20 wherein said estimated carbon content factor comprises a predetermined constant value for said at least one potential constituent of said hydrocarbon feedstock.

25. (New) The flow metering system of claim 20 wherein said controller is configured to:

process measured process conditions to improve the estimate of said estimated carbon content factor.

26. (New) The flow metering system of claim 20 wherein said first flowmeter comprises a Coriolis mass flowmeter.

27. (New) The flow metering system of claim 20 wherein said second flowmeter comprises a Coriolis mass flowmeter.

28. (New) The flow metering system of claim 20 further comprising:  
said hydrogen production system that comprises a Steam Reformation of Hydrogen (SRH) system.

29. (New) The flow metering system of claim 20 further comprising:  
a first valve coupled to said controller and configured to control flow of said hydrocarbon feedstock responsive to instructions from said controller; and  
a second valve coupled to said controller and configured to control flow of said steam responsive to instructions from said controller.

30. (New) A method of operating a flow metering system for controlling a reformation reaction in a hydrogen production system, said method comprising the steps of:

measuring a mass flow rate of a hydrocarbon feedstock delivered to said hydrogen production system to provide a hydrocarbon mass flow rate measurement;

measuring a flow rate of steam delivered to said hydrogen production system to provide a steam flow rate measurement;

identifying an estimated carbon content factor, said estimated carbon content factor being based on at least one potential constituent of said hydrocarbon feedstock;

processing said mass flow rate of said hydrocarbon feedstock and said estimated carbon content factor to determine an estimated carbon content of said hydrocarbon feedstock;

identifying a carbon-to-steam ratio for said hydrogen production system; and

processing said estimated carbon content of said hydrocarbon feedstock, said flow rate of said steam, and said carbon-to-steam ratio to control at least one of said flow rate of said steam and said flow rate of said hydrocarbon feedstock.

31. (New) The method of claim 30 wherein said estimated carbon content factor is based on a mass of carbon for said at least one potential constituent of said hydrocarbon feedstock.

32. (New) The method of claim 30 wherein said estimated carbon content factor is based on said mass of carbon for said at least one potential constituent in relation to a total mass of said at least one potential constituent.

33. (New) The method of claim 30 wherein the step of identifying an estimated carbon content factor comprises the step of:

selecting said estimated carbon content factor from a range of carbon content factors for said hydrocarbon feedstock.

34. (New) The method of claim 30 wherein said estimated carbon content factor comprises a predetermined constant value for said at least one potential constituent of said hydrocarbon feedstock.

35. (New) The method of claim 30 further comprising the step of:  
processing measured process conditions to improve the estimate of said estimated carbon  
content factor.

36. (New) The method of claim 30 wherein the step of measuring a mass flow rate of a  
hydrocarbon feedstock comprises the step of:

measuring said mass flow rate of said hydrocarbon feedstock using a Coriolis mass  
flowmeter.

37. (New) The method of claim 30 wherein the step of measuring a flow rate of steam  
comprises the step of:

measuring said flow rate of said steam using a Coriolis mass flowmeter.

38. (New) The method of claim 30 wherein said hydrogen production system comprises  
a Steam Reformation of Hydrogen (SRH) system.

39. (New) The method of claim 30 further comprising:  
controlling flow of said hydrocarbon feedstock using a first valve; and  
controlling flow of said steam using a second valve.

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